CHAPTER 8: WHAT DID WE LEARN ABOUT CARGO ACTIVITY?

Why is Cargo Activity Important to Washington State?

Air cargo is an economic enabler and driver for Washington State and its communities. Its impact is felt within the businesses supporting air cargo operations as well as in those businesses that depend upon air cargo for shipments of goods and materials.

Air cargo impacts both businesses supporting air cargo operations and businesses that depend upon air cargo for shipments of goods and materials.

- Air cargo operations directly drive employment for the air carrier at the local airports as well as in courier and trucking organizations. This employment provides wages to be spent in the local community.

- Air cargo operations support local businesses through enabling shipment and receipt of goods for utilization in production or documents which support business operations. Through enabling these businesses, the businesses create employment opportunities, growing the local wage base and stimulating spending in the local economy.

Air cargo supports time-definite needs in manufacturing, document exchange, and finished goods delivery

The value of air cargo to businesses is also demonstrated in their continued use of air cargo for shipments. Though air cargo is a more expensive mode of transport than trucking, rail, or ocean shipment, it supports time-definite needs in manufacturing, document exchange, and finished goods delivery. Individuals and organizations utilizing air cargo pay a "premium" for this time definite delivery and the benefit of the time definite delivery exceeds the cost of air cargo. Benefits can include reduced inventory carrying costs, more timely replacement of broken parts, or fulfillment of customer requirements.

In Phase II of LATS, we have prepared forecasts of various measures of aviation demand at Washington airports. Air cargo demand forecasts have also been developed and will be utilized in the evaluation of whether the Washington State aviation system is capable of supporting continued regional and statewide economic growth.

What is Existing Activity across the State?

Air Freight and Air Mail

In 2005, total enplaned and deplaned air cargo tonnage in Washington State amounted to approximately 601,000 tons. Enplaned air cargo refers

to cargo that is loaded onto aircraft at an airport. Deplaned air cargo refers to cargo that is off-loaded from aircraft at an airport.

The majority of Washington air cargo activity is currently concentrated at three airports: Sea-Tac, Boeing Field, and Spokane.

Air cargo activity in Washington State is currently highly concentrated at a small number of Washington airports. As shown by the tonnage data in the list below, about 98.3 percent of the state's air cargo activity is concentrated at three airports: Sea-Tac, Boeing Field, and Spokane International. Out of twenty-four airports reporting air cargo activity in 2005, the top ten airports in terms of air cargo tonnage account for about 99.8 percent of the state's air cargo activity. Outside of these ten airports, the remaining air cargo activity across the state represents a mere 0.2 percent of total air cargo activity.

Figure 112: 2005 Washington State Top 24 Airports in Air Cargo Tonnage

Rank		Airport	Tons	Percent of Total
1	SEA	Sea-Tac International	373,233	62.06%
2	BFI	Boeing Field/King County Int'l	124,620	20.72%
3	GEG	Spokane International	93,424	15.53%
4	PSC	Tri-Cities	3,377	0.56%
5	YKM	Yakima Air Terminal	2,268	0.38%
6	BLI	Bellingham International	1,215	0.20%
7	EAT	Pangborn Memorial	654	0.11%
8	MWH	Grant County International	530	0.09%
9	CLM	Wm. R. Fairchild International	519	0.09%
10	BVS	Skagit Regional	384	0.06%
11	ORS	Orcas Island	369	0.06%
12	OMK	Omak	366	0.06%
13	TCM	Tacoma Mcchord AFB	183	0.03%
14	FRD	Friday Harbor	155	0.03%
15	76S	Wes Lupien	57	0.01%
16	PAE	Paine Field	36	0.01%
17	PUW	Pullman/Moscow Regional	27	0.00%
18	ALW	Walla Walla Regional	9	0.00%
19	EPH	Ephrata Municipal	3	0.00%
20	S98	Vista Field	3	0.00%
21	SFF	Felts Field	3	0.00%
	Subtotal		601,434	100.00%
	All Others		2	0.00%
	Total		**601,436**	**100.0%**

Source: US DOT, SEA/BFI airport records, SH&E analysis

While this concentration of air cargo activity at Sea-Tac, Boeing Field and Spokane is notable, the smaller volumes elsewhere still represent a significant level of economic activity in the smaller communities. For example, at Pasco, where 96 percent of the tonnage is carried by express

carriers, the air cargo volume represents approximately 4,100 packages a day in each direction, assuming average FedEx domestic package weight[104]. Similarly Wenatchee's business day tonnage represents over 800 packages per business day each way, and Port Angeles' business day tonnage represents 600 packages per day each way.

541,000 tons of air freight were reported in 2005.

Apart from serving businesses, current air cargo activity in small communities also provides residents with significant accessibility to the statewide air cargo network.

Domestic activity makes up 85 percent of Washington's air freight activity, with Asia and Europe activity also significant.

For the purposes of LATS, air cargo has been divided into two basic categories: air freight and air mail. Air freight, consisting of all non-mail items transported by air, is the main component of air cargo and can be further subdivided into standard freight and express freight (freight carried by integrated carriers such as DHL, FedEx, and UPS).

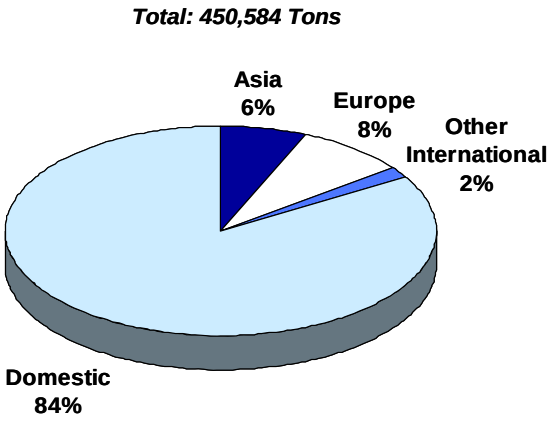
Air Freight

In 2005, total air freight volume in Washington State amounted to 541,000 tons, approximately 90 percent of total air cargo volume.

Nearly 85 percent of Washington's air freight activity is currently domestic activity, involving the movement of air freight between the state and other points in the U.S. Around 16 percent of Washington's air freight activity is international, with Asia activity and Europe activity representing the two most significant segments. About 8 percent of Washington's air freight activity represents activity between Washington State and Europe, and about 6 percent activity between the state and Asia. See Figure 113 on the following page.

[104] According to FedEx's 2005 financial reports, average weight for an express package is 3.3 pounds.

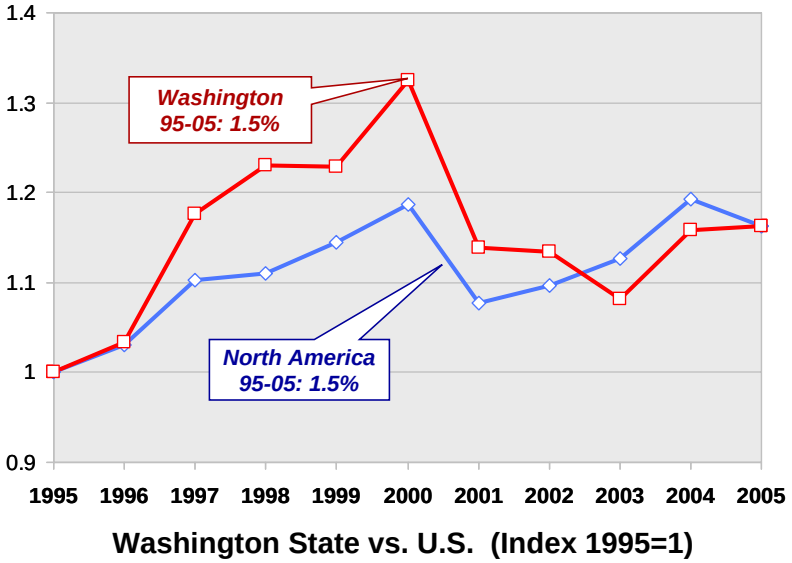
Figure 113: 2005 Washington State Air Freight



Source: SH&E analysis

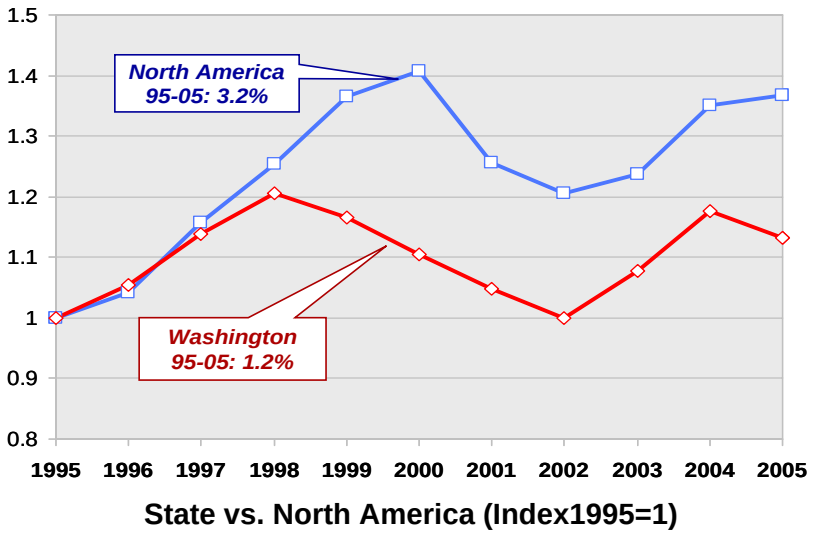
Washington State's domestic enplaned freight grew from 191,000 tons in 1995 to 222,000 tons in 2005 at an average rate of 1.5 percent over the ten year period. Washington's European air freight grew from 39,000 tons in 1995 to 44,000 tons in 2005, an average annual growth of 1.2 percent. Asian air freight grew from 25,000 tons in 1995 to 34,000 tons in 2005, an average annual growth of 3.5 percent. See Figure 114 below, and Figure 115 and 116 on the following page for a comparison of Washington State and North America historical air freight activity by region.

Figure 114: Indexed Domestic Air Freight:



Source: Boeing World Cargo Forecast, 2006/2007, SH&E analysis

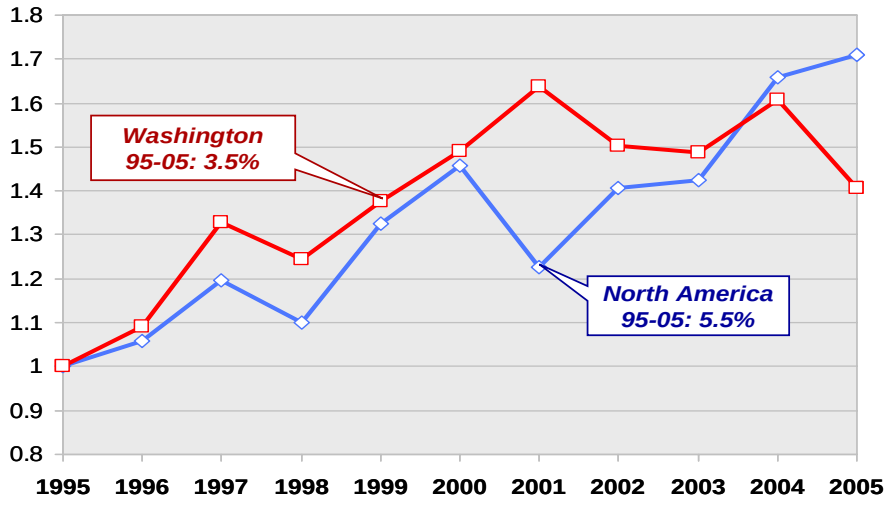
Figure 115: Indexed Europe Air Freight: Washington



Source: Boeing World Cargo Forecast, 2006/2007, SH&E analysis

Figure 116: Indexed Asia Air Freight: Washington State vs. North America (Index 1995=1)

61,000 tons of air mail were reported in 2005.



Source: Boeing World Cargo Forecast, 2006/2007, SH&E analysis

Air Mail

In 2005, total air mail volume in Washington State amounted to 61,000 tons, approximately 10 percent of total air cargo volume.

Five airports reported air mail activity: Sea-Tac, Boeing Field, Spokane, Pasco, and Moses Lake. Again, Sea-Tac, Boeing Field, and Spokane

accounted for almost 100 percent of the air mail activity. Sea-Tac was the only airport with international activity; its 2005 international air mail volume was estimated at 490 tons.

Operational Patterns

Three primary models of air cargo operations in Washington: integrated express freight carrier operations, feeder services, and scheduled/ad hoc freight operations through Sea-Tac.

An analysis of air cargo flight patterns across the state revealed primary models of air cargo operations in Washington State.

1. Integrated express freight carrier (DHL, FedEx, and UPS) operations.

2. Carriers typically operate from Sea-Tac, Boeing Field, and Spokane, the main integrated express carrier points of collection and distribution, to the carriers' main and regional hubs which include:

- DHL: Wilmington, Riverside (CA)
- FedEx: Memphis, Oakland, Indianapolis, Newark, Alliance
- UPS: Louisville, Hartford, Philadelphia, Ontario (CA), Dallas

3. Integrated express freight carrier (DHL, FedEx, and UPS) feeder services

- Feeder services typically operate from smaller Washington airports such as Yakima, Port Angeles, and Skagit to Sea-Tac, Boeing Field, and Spokane

Top Washington exports include fruit and nuts, wood, industrial machinery, fish products, and photo and medical equipment.

4. Freight carriers operating scheduled and ad hoc services

- Carriers principally operate from their hubs to Sea-Tac and then on to other destinations, for example:
  - EVA service with a routing from Taipei (hub) to Seattle to Newark
  - Kitty Hawk Airlines with a routing from Fort Wayne (hub) to Seattle to Portland

Representative flight pattern information is presented in the technical memorandum.

Main Commodities

An analysis of the main commodities making up Washington's export air freight was conducted. Main exports from Washington State include fruit and nuts, wood (mostly to Canada), industrial machinery, fish products, and photo and medical equipment. While analysis was limited to commodities shipped out of the U.S. from Washington, domestic shipments are most probably comprised of the same main commodities. A detailed air cargo export commodity chart is shown below.

Figure 117: Washington State Leading Export Commodities

Partner Country	Air Weight (KG 000s)	% of Total
Canada	17,096	23%
Japan	11,175	15%
China	7,683	10%
United Kingdom	4,765	6%
Netherlands	4,668	6%
Germany	3,128	4%
Hong Kong	2,684	4%
Korea	2,437	3%
Australia	2,292	3%
Singapore	2,155	3%
Ireland	1,449	2%
Other	14,592	20%
Total	74,124	100%

SH&E Analysis, WISER Trade, 2006

Washington's top export destinations include Canada, Japan, China, and the UK.

Commodity export proportions were relatively consistent over the 2003 to 2006 period, with the most notable change being in wood products exports, which grew significantly from less than 1 percent of total exports in 2003 to approximately 11 percent in 2006.

Washington's top export destinations include Canada (23 percent of total export air cargo tonnage), Asian countries Japan, China, Hong Kong, and Korea (which together make up 32 percent of export air cargo tonnage), and European countries the UK, Netherlands, and Germany (together making up 20 percent of export air cargo tonnage).

Figure 118: Trading Partner Exports, By Country

Commodity	Air Weight (KG 000s)	% of Total
Edible Fruit & Nuts	12,293	17%
Wood	8,215	11%
Industrial Machinery & Computers	7,292	10%
Fish	7,072	10%
Photo & Medical Equipment	4,319	6%
Electric Machinery	3,965	5%
Aircraft and Parts Therof	3,212	4%
Inorganic Chemicals	2,683	4%
Mineral Fuel & Oil	2,525	3%
Iron & Steel	2,352	3%
Other	20,195	27%
Total	74,123	100%

Source: SH&E analysis, WISER Trade, 2006

Scope of Forecasts

Air cargo forecasts were developed for the top ten cargo airports.

In Phase II of LATS, air cargo forecasts were developed for the top ten cargo airports in Washington State based on 2005 air cargo volume. Air cargo tonnage at these ten airports representing approximately 98 percent of the state's air cargo volume, the forecast of future air cargo demand at these airports gives us a good picture of the future demand for air cargo activity across Washington State as a whole. The ten airports included in the LATS Phase II analysis are identified in Figure 119 below.

Figure 119: 2005 Washington State Top 10 Airports in Air Cargo Tonnage

Rank	Airport		Tons	Percent of Total
1	SEA	Sea-Tac International	373,233	62.06%
2	BFI	Boeing Field/King County	124,620	20.72%
3	GEG	Spokane International	93,424	15.53%
4	PSC	Tri-Cities	3,377	0.56%
5	YKM	Yakima Air Terminal	2,268	0.38%
6	BLI	Bellingham International	1,215	0.20%
7	EAT	Pangborn Memorial	654	0.11%
8	MWH	Grant County International	530	0.09%
9	CLM	Wm. R. Fairchild International	519	0.09%
10	BVS	Skagit Regional	384	0.06%
	All Others		1,211	0.20%
	Total		**601,435**	**100.0%**

Source: SH&E analysis

Forecasts were developed for the period 2006-2030.

Forecasts were developed for the period from 2006 to 2030, with 2005 serving as the base year.

The following air cargo activity measures were forecast at each airport:

- Air cargo volume
  - Freight, Express, and Mail
  - Domestic, Asia, Europe, and Other International
  - Enplaned, and Deplaned
- Air cargo operations (for dedicated freight and express operations)
  - By aircraft type

The air cargo operations in the LATS Phase II forecast are "all-cargo" operations. All-cargo operations are operations associated with aircraft used for the sole purpose of transporting cargo only. Forecast operations therefore do not account for operations associated with either belly cargo (cargo carried on passenger aircraft) or air mail (generally carried as belly cargo). The forecast all-cargo operations are grouped in four categories based on aircraft capacity: Large Widebody, Medium Widebody, Narrowbody, and Small.

Forecast Methodology

Air Cargo Volume Forecast

A top-down approach used to develop air cargo volume forecasts.

A top-down approach was used to develop air cargo volume forecasts for the ten Washington cargo airports. First, overall air cargo volume at the state level was forecast for Washington State. This state-level forecast was then used to derive air cargo volume forecasts for Washington airports at the individual airport level.

Freight

Overall air freight volume was forecast for Washington State, based on the air freight volume forecast for North America as a whole[105] and the historical relationship between Washington State and North America cargo activity.

Economic growth outlook[106] was developed for each airport area and used in conjunction with the state-wide freight volume forecast to derive freight volume growth rates for each of the airports. The economic growth

[105] Source: Boeing World Air Cargo Forecast
[106] Source: Income projects by county, NPA data services.

outlook encompassed elements such as population, income, and employment.

Finally, the forecast freight volume at the individual airport was allocated to either Standard carriers[107] or Integrated Express carriers according to the tonnage share by carrier type in the base year 2005. Shares are assumed to stay constant over the forecast period.

Air Mail

Air mail volume from the base year 2005 was held constant through the forecast period. The reason for this is the historical trend of reported air mail volume decline in Washington State. Sea-Tac's records show that its air mail volume has declined 6 percent annually for the past ten years. The go-forward forecast has held air cargo constant to maintain a conservative operational perspective.

Air Cargo Operations Forecast

Tonnage share by aircraft type and average carried tons per operation by aircraft type used to derive air cargo operations forecasts.

The two main drivers in deriving the all cargo operations forecast were tonnage share by aircraft type and average carried tons per operation by aircraft type. Once air freight volume was forecast at an airport, the freight volume was split across the four aircraft types, based on SH&E's assumption of future tonnage share change at the airport. Average carried tonnage per operation by aircraft type was then applied to forecast volumes to derive forecast operations by aircraft type.

Refer to the Cargo Forecast Technical Memorandum for a more detailed account of forecast methodology.

Forecast Results

Washington State

Total air cargo volume in Washington State to grow from 600,000 tons in 2005 to 1,407,000 tons in 2030.

Washington's air cargo volume is expected to grow from approximately 600,000 tons in 2005 to 1,407,000 tons in 2030. This growth will occur across the freight and express categories with mail remaining constant at approximately 61,000 tons.

Other specific items of interest include the following:

- Belly cargo (cargo carried on passenger aircraft)
    - Projected to grow from 126,000 tons (23 percent of air freight tonnage) in 2005 to 322,000 tons (24 percent of air freight

[107] Includes all cargo carriers and passenger airlines carrying belly cargo.

tonnage) in 2030. It is important to note that legislation was passed in January 2007 that would require 100 percent screening of all cargo carried on passenger aircraft within or entering the US. No determination on implementation measures has been made, but this could impact belly cargo, potentially driving an increase in all-cargo carrier activity or a migration of some cargo to truck transport. For the forecast presented, it is anticipated that adequate provisions will be made to facilitate the continued carriage of air cargo on passenger aircraft as this is an important economic element for the air carriers.

- International air cargo
    - Expected to grow from 90,000 tons (15 percent of total air cargo tonnage) to 223,000 tons (16 percent of total air cargo tonnage) by 2030.
- Express air cargo
    - Expected to grow from 334,000 tons (56 percent of total air cargo tonnage) to 824,000 tons (59 percent of total air cargo tonnage) by 2030.

Total all-cargo operations in Washington State to grow from 51,000 operations in 2005 to 75,000 operations in 2030.

Washington's all-cargo operations are expected to grow from 51,000 operations in 2005 to 75,000 operations in 2030. This growth will occur across the various aircraft types, with small aircraft operations continuing to make up the bulk of operations, growing from 36,000 operations (70 percent of total all-cargo operations) to 44,000 operations (60 percent of total all-cargo operations).

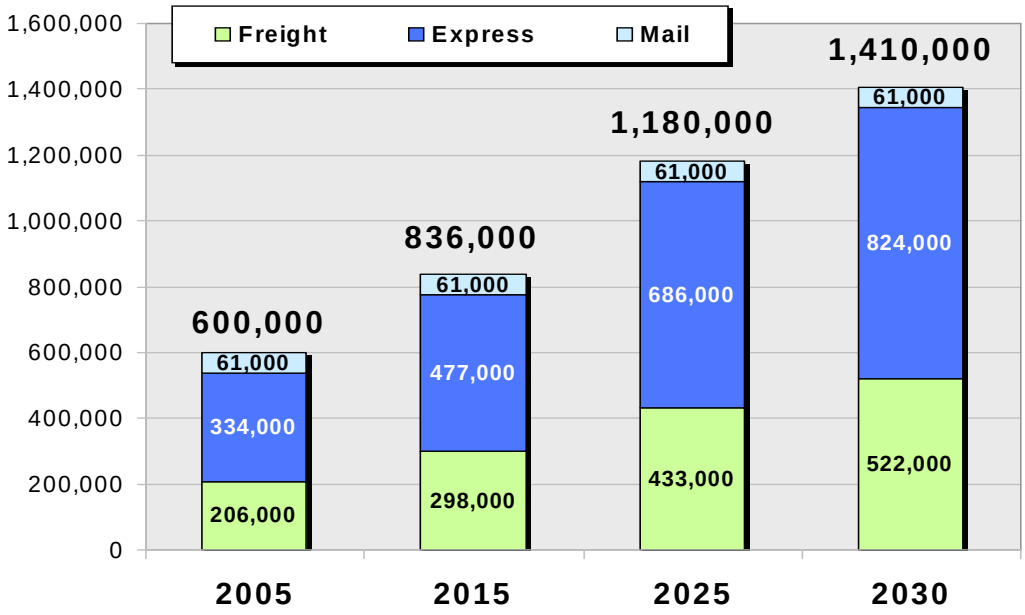
See Figure 120 below, and Figures 121, 122 and 123 on the following pages for the air cargo volume and air cargo operations forecast for Washington State.

Figure 120: Summary Air Cargo Forecast – Top 10 Washington Cargo Airports

	2005	2015	2025	2030	CAGR 05-15	CAGR 15-25	CAGR 25-30	CAGR 05-30
Air Cargo Volume (Tons)								
Enplaned	278,374	386,242	543,388	647,377	3.3%	3.5%	3.6%	3.4%
Deplaned	321,850	449,648	636,186	759,804	3.4%	3.5%	3.6%	3.5%
Total	***600,224***	***835,891***	***1,179,574***	***1,407,181***	***3.4%***	***3.5%***	***3.6%***	***3.5%***
Domestic	510,500	708,760	995,804	1,184,568	3.3%	3.5%	3.5%	3.4%
International	89,724	127,131	183,770	222,613	3.5%	3.8%	3.9%	3.7%
Total	***600,224***	***835,891***	***1,179,574***	***1,407,181***	***3.4%***	***3.5%***	***3.6%***	***3.5%***
Freight	205,720	297,736	432,575	522,102	3.8%	3.8%	3.8%	3.8%
Express	333,623	477,273	686,118	824,198	3.6%	3.7%	3.7%	3.7%
Mail	60,881	60,881	60,881	60,881	0.0%	0.0%	0.0%	0.0%
Total	***600,224***	***835,891***	***1,179,574***	***1,407,181***	***3.4%***	***3.5%***	***3.6%***	***3.5%***
Freight Volume (Tons)								
Domestic	450,110	648,369	935,414	1,124,177	3.7%	3.7%	3.7%	3.7%
International	89,233	126,640	183,280	222,123	3.6%	3.8%	3.9%	3.7%
Total	***539,343***	***775,010***	***1,118,693***	***1,346,300***	***3.7%***	***3.7%***	***3.8%***	***3.7%***
All Cargo	413,570	592,517	853,412	1,024,237	3.7%	3.7%	3.7%	3.7%
Belly Cargo	125,773	182,492	265,281	322,063	3.8%	3.8%	4.0%	3.8%
Total	***539,343***	***775,010***	***1,118,693***	***1,346,300***	***3.7%***	***3.7%***	***3.8%***	***3.7%***
All Cargo Volume (Tons)								
Large Widebody	59,987	85,130	133,326	170,766	3.6%	4.6%	5.1%	4.3%
Medium Widebody	269,990	395,712	569,996	680,386	3.9%	3.7%	3.6%	3.8%
Narrowbody	58,038	76,847	101,523	116,106	2.8%	2.8%	2.7%	2.8%
Small	25,555	34,828	48,567	56,979	3.1%	3.4%	3.2%	3.3%
Total	***413,570***	***592,517***	***853,412***	***1,024,237***	***3.7%***	***3.7%***	***3.7%***	***3.7%***
All Cargo Operations								
Large Widebody	1,056	1,417	2,219	2,872	3.0%	4.6%	5.3%	4.1%
Medium Widebody	8,590	11,642	15,660	18,099	3.1%	3.0%	2.9%	3.0%
Narrowbody	5,967	7,085	8,551	9,388	1.7%	1.9%	1.9%	1.8%
Small	35,701	38,737	42,583	44,380	0.8%	1.0%	0.8%	0.9%
Total	***51,314***	***58,881***	***69,013***	***74,739***	***1.4%***	***1.6%***	***1.6%***	***1.5%***

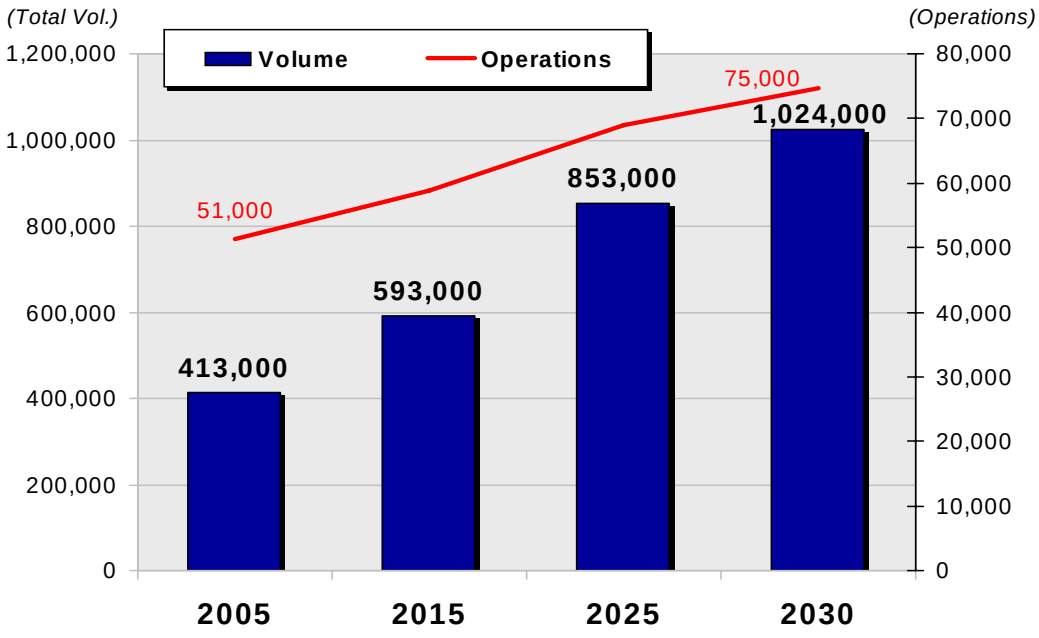
Source: SH&E forecast

Figure 121: Washington State Air Cargo Volume (Tons) Forecast by Cargo Type



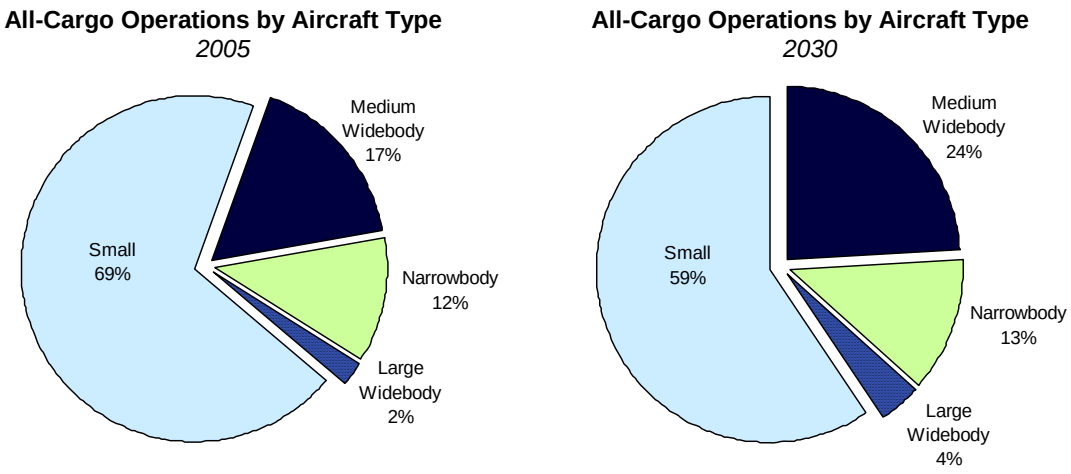
Source: SH&E forecast

Figure 122: Washington State Total All-Cargo Volume (Tons) and All-Cargo Operations Forecast



Source: SH&E forecast

Figure 123: Washington State Current and Forecast All-Cargo Operations by Aircraft Type



Source: SH&E forecast

Individual Airports Discussion

SEA – Seattle Tacoma Airport

SEA freight volume more than doubles over the next 25 years from 314,000 tons in 2005 to 794,000 tons in 2030.

The air freight volume at Seattle's Sea-Tac airport is projected to grow from 314,000 tons in 2005 to 794,000 tons in 2030, more than doubling over the next 25 years. Looking at regional growth from Sea-Tac, the Asian segment will experience the fastest growth, with an average growth of 4.5 percent per year. Seattle's air freight volume is split between freight and express with a 59 percent to 41 percent ratio.

Sea-Tac generated 59,000 tons of air mail in 2005. Adding air mail to the air freight forecast, Sea-Tac's total air cargo is projected to grow from 373,000 tons in 2005 to 853,000 tons in 2030 at an average annual growth of 3.4 percent. PSRC's study[108] projected 3.5 percent growth for the period of 2004 and 2025, reaching 708,000 tons in 2025.

Freight operations grow at an average rate of 2.2 percent per year.

There were about 9,500 freight operations at Sea-Tac in 2005 and operations are projected to grow to over 16,000 by 2030 at an average rate of 2.2 percent.[109] Because there is ample available capacity on the planes currently operating at Sea-Tac, it is logical to expect that the carriers will put more volume on existing flights before increasing the number of operations. The detailed air freight volume and all-cargo operations forecast can be found in the technical memorandum.

[108] Regional Air Cargo Strategy, PSRC, Final Report October 2006.
[109] PSRC study projected 2.1 percent growth in commercial operations including passenger operations. Domestic all-cargo operation is projected to grow at 2.2 percent on average.

BFI – Boeing Field / King County International Airport

Freight volume at BFI more than doubles over the next 20 years from 124,000 tons in 2005 to 333,000 tons in 2030.

The air freight volume at Seattle's Boeing Field (BFI) airport is projected to grow from 124,000 tons in 2005 to 333,000 tons in 2030, more than doubling over the next 25 years. Over 90 percent of the activity at BFI is for Domestic air freight. The remaining percentage of air freight activity represents limited International activity, primarily service to Canada.

Ninety-six percent of freight is carried by Express carriers at BFI. BFI had very little air mail in 2005, with only 300 tons. BFI's total air cargo activity is projected to grow from 125,300 tons to 334,000 tons in 2030 with an average annual growth of 4 percent. PSRC's study[110] projected 3.2 percent growth for the period of 2004 and 2025, reaching 243,000 tons in 2025. Our forecast is more aggressive due to stronger Domestic activity outlook.

Freight operations at BFI grow at an average rate of 1.6 percent per year.

There were approximately 21,500 freight operations at BFI in 2005 and operations are projected to grow to over 31,000 by 2030 at an average growth rate of 1.6 percent.[111] Over 70 percent of current operations are flown by small carriers including check-carriers and Airpac. Because these carriers operate with very light loads on the existing planes, they are not likely to increase the frequency despite the volume increase. The detailed air freight volume and all-cargo operations forecast can be found in the technical memorandum.

GEG – Spokane International Airport

The air freight volume at Spokane (GEG) is projected to grow from 92,000 tons in 2005 to 198,000 tons in 2030

The air freight volume at Spokane (GEG) is projected to grow from 92,000 tons in 2005 to 198,000 tons in 2030 growing at an average rate of 3.1 percent per year. Over 90 percent of the volume is concentrated in the domestic segment, with the other 10 percent representing international freight, primarily to Canada.

Ninety-eight percent of freight is carried by Express carriers at GEG. GEG generated 1,200 tons of air mail in 2005. GEG's total air cargo is projected to grow from 93,000 tons in 2005 to 199,000 tons in 2030.

There were about 11,000 freight operations at GEG in 2005 and operations are projected to grow to over 15,000 by 2030 at an average rate of 1.3 percent. The detailed air freight volume and all-cargo operations forecast can be found in the technical memorandum.

[110] Regional Air Cargo Strategy, PSRC, Final Report October 2006.
[111] PSRC study projected the operations to grow to 34,000 in 2025, at an average annual growth of 1.9 percent between 2004 and 2025.

PSC - Pasco / Tri-Cities Airport

The air freight volume at Pasco (PSC) is projected to grow from 3,400 tons in 2005 to 8,400 tons in 2030 growing at an average rate of 3.7 percent per year. The airport does not have any international activity.

PSC freight operations grow at an average rate of 1.7 percent per year.

Ninety-six percent of freight is carried by Express carriers at PSC. To add perspective to the importance of this activity at PSC, 96 percent of the freight represents 6.53 tons of freight per business day, each way. This equals approximately 4,144 average FedEx Express packages per day each way based upon the company's 2005 average Express package statistics. PSC generated 3 tons of air mail in 2005. PSC's total air cargo is projected to grow from 3,400 tons in 2005 to 8,400 tons in 2030.

There were about 1,500 freight operations at PSC in 2005 and operations are projected to grow to over 2,350 by 2030 at an average rate of 1.7 percent. The detailed air freight volume and all-cargo operations forecast can be found in Appendix A.

YKM – Yakima Airport

Freight volume at YKM grows at an average rate of 2.8 percent per year.

The air freight volume at Yakima (YKM) is projected to grow from little over 2,300 tons in 2005 to 4,500 tons in 2030 growing at an average rate of 2.8 percent per year. The airport does not have any international activity.

Ninety-eight percent of freight is carried by Express carriers at YKM. To add perspective to the importance of this activity at YKM, 98 percent of the freight represents 4.5 tons of freight per business day, each way. This equals approximately 2,862 average FedEx Express packages per day each way based upon the company's 2005 average Express package statistics. YKM did not have any air mail in 2005.

There were about 1,300 freight operations at YKM in 2005 and operations are projected to grow to over 1,600 by 2030 at an average rate of 0.8 percent. The detailed air freight volume and all-cargo operations forecast can be found in Appendix A.

BLI – Bellingham International Airport

BLI freight volume grows at an average rate of 3.8 percent per year.

The air freight volume at Bellingham (BLI) is projected to grow from 1,200 tons to 3,000 tons in 2030 growing at an average rate of 3.8 percent per year. The international segment's share is projected to increase from 2 percent in 2005 to 4 percent in 2030, representing an increase in tonnage from 27 to 115 tons.

Ninety percent of the freight is carried by Express carriers at BLI. To add perspective to the importance of this activity at BLI, 90 percent of the freight represents 2.16 tons of freight per business day, each way. This equals approximately 1,371 average FedEx Express packages per day each way based upon the company's 2005 average Express package statistics. BLI did not have any air mail in 2005.

There were about 2,500 freight operations at BLI in 2005 and operations are projected to grow to over 3,000 by 2030 at an average rate of 0.8 percent. The detailed air freight volume and all-cargo operations forecast can be found in Appendix A.

EAT – Wenatchee / Pangborn Memorial Airport

EAT freight volume grows at an average rate of 2.9 percent per year.

The air freight volume at Wenatchee (EAT) is projected to grow from 650 tons in 2005 to 1,350 tons in 2030 growing at an average rate of 2.9 percent per year. The airport has only domestic activity.

Ninety-five percent of the freight is carried by Express carriers at EAT. To add perspective to the importance of this activity at EAT, 95% of the freight represents 1.3 tons of freight per business day, each way. This equals approximately 825 average FedEx Express packages per day each way based upon the company's 2005 average Express package statistics. EAT did not have any air mail in 2005.

There were about 1,200 freight operations at EAT in 2005 and operations are projected to grow to over 1,370 by 2030 at an average rate of 0.4 percent. The detailed air freight volume and all-cargo operations forecast can be found in the technical memorandum.

MWH – Moses Lake / Grant County International Airport

Freight volume at MWH grows at an average rate of 3.0 percent per year.

The air freight volume at Moses Lake (MWH) is projected to grow from 500 tons in 2005 to 1,100 tons in 2030 growing at an average rate of 3.0 percent per year. The freight activity is 100 percent domestic.

All freight volume is carried by Express carriers at MWH. To add perspective to the importance of this activity at MWH, 100 percent of the freight represents 1 ton of freight per business day, each way. This equals approximately 635 average FedEx Express packages per day each way based upon the company's 2005 average Express package statistics. MWH data showed 1 ton of air mail in 2005.

There were about 1,250 freight operations at MWH in 2005 and operations are projected to grow to over 1,400 by 2030 at an average rate of 0.5 percent. The detailed air freight volume and all-cargo operations forecast can be found in the technical memorandum.

CLM – Port Angeles / Wm. R. Fairchild International Airport

Freight volume at CLM grows at an average rate of 3.6 percent per year.

The air freight volume at Port Angeles (CLM) is projected to grow from 500 tons in 2005 to 1,300 tons in 2030 growing at an average rate of 3.6 percent per year. The freight activity is 100 percent domestic at CLM.

All freight volume is carried by Express carriers at CLM. To add perspective to the importance of this activity at CLM, 100 percent of the freight represents 1 ton of freight per business day, each way. This equals approximately 635 average FedEx Express packages per day each way based upon the company's 2005 average Express package statistics. CLM did not have any air mail in 2005.

There were 990 freight operations at CLM in 2005 and operations are projected to grow to about 1,300 by 2030 at an average rate of 1.1 percent. The detailed air freight volume and all-cargo operations forecast can be found in the technical memorandum.

BVS – Skagit / Mount Vernon Airport

BVS freight volume grows at an average rate of 3.8 percent per year.

The air freight volume at Mount Vernon (BVS) is projected to grow from 380 tons in 2005 to 980 tons in 2030 growing at an average rate of 3.8 percent per year. The airport has only domestic activity.

All freight volume is carried by Express carriers at BVS. To add perspective to the importance of this activity at BVS, 100 percent of the freight represents .76 tons of freight per business day, each way. This equals approximately 483 average FedEx Express packages per day each way based upon the company's 2005 average Express package statistics. BVS did not have any air mail in 2005.

There were 675 freight operations at BVS in 2005 and operations are projected to grow to over 825 by 2030 at an average rate of 0.8 percent. The detailed air freight volume and all-cargo operations forecast can be found in the technical memorandum.

Key Findings

Air Cargo Volume Expected to Increase Significantly by 2030

Overall, Washington State air cargo to grow at 3.5 percent annually, from 600,000 tons in 2005 to 1,410,000 tons in 2030.

First, Washington State freight tonnage is anticipated to grow at 3.8 percent per year through the 25-year forecast period. Domestic freight, which represents 80 percent of statewide freight tonnage, is also projected to grow 3.8 percent per year. Air freight between Washington and Europe is projected to grow 2.1 percent per year, while Asian air freight is projected to grow 4.5 percent per year. Other air freight, mostly to Canada, is projected to grow at the same rate as domestic freight.

Asian freight fastest growing at 4.5 percent per year, while domestic freight grows at 3.8 percent.

Air mail at Washington airports has declined due to regulations on mail carried on passenger aircraft that were enacted after September 11th, the greater use of trucking, and the re-classification of some mail to freight following the U.S. Postal Service decision to use Federal Express for some mail traffic. The study did not identify additional factors likely to restrict air mail traffic further, and the forecast calls for mail traffic to remain constant during the forecast period.

Combining freight and air mail, overall Washington State air cargo is forecast to grow 3.5 percent annually for the forecast period, 3.5 percent for domestic and 3.7 percent for international. Tonnage is projected to grow from 600,000 in 2005 to 1,410,000 in 2030. Ninety percent of this activity today is freight and that proportion will grow as the relative proportion of air mail is projected to decline.

All-Cargo Operations Grow with Small Aircraft Operations Maintaining the Largest Share through 2030

In terms of operations, all-cargo aircraft operations are projected to grow from approximately 51,000 to 75,000 annual operations over the forecast period. Specific category growth is as follows:

- Large Widebody: from 1,000 to 3,000 annual operations
- Medium Widebody: from 9,000 to 18,000 annual operations
- Narrowbody: from 6,000 to 9,000 annual operations
- Small: from 36,000 to 44,000 annual operations

Except at Sea-Tac, small aircraft operations make up most if not all of all-cargo operations at airports.

Small all-cargo aircraft operations account for 41 percent of the cargo operations at Sea-Tac, 71 percent at Spokane, 65 percent at Boeing Field, and 100 percent of the all-cargo operations at the seven other Phase II cargo airports. Easy to overlook, small all-cargo aircraft activity supports significant volumes of express activity supporting local business and community development. While the forecast annual growth in large

widebody operations and medium widebody operations (4.1 percent and 3.0 percent respectively) far outstrips the forecast growth in small aircraft operations (0.9 percent), small aircraft operations remains the largest share of statewide all-cargo operations. In 2005, small aircraft operations accounted for 69 percent of Washington State all-cargo operations. In 2030, small aircraft operations are still expected to account for 59 percent of statewide all-cargo operations.

Concentration in Seattle and Spokane Expected to Remain Consistent Through 2030

Concentration of air cargo activity in Seattle and Spokane areas expected to continue to drive infrastructure requirements

Air cargo is principally concentrated in the major population and economic activity centers of the state. In 2005, the bulk of Washington's air cargo activity took place in the Seattle area (83 percent of state's air cargo tonnage) and Spokane (16 percent of state's air cargo tonnage. Based upon the forecast cargo activity, the concentration of air cargo activity is expected to remain relatively consistent, with a slight increase in terms of concentration in Seattle and a slight decrease in Spokane. Across the other airports, the forecast shows an overall growth of air cargo activity. Pasco's relative share of air cargo activity is projected to grow .04 percent over the forecast period while Yakima's relative share is expected to decline by approximately .06 percent. The other five airports surveyed had relatively small share shifts as shown in the table below.

Figure 124: Air Cargo Forecast Concentration

		Tons				Share			
Airport		2005	2015	2025	2030	2005	2015	2025	2030
SEA	Sea-Tac International	373,233	513,021	717,651	853,405	62.2%	61.4%	60.8%	60.6%
BFI	Boeing Field Int'l	124,620	184,487	273,659	333,574	20.8%	22.1%	23.2%	23.7%
GEG	Spokane International	93,423	125,878	170,757	199,473	15.6%	15.1%	14.5%	14.2%
PSC	Tri-Cities	3,377	4,858	6,989	8,384	0.6%	0.6%	0.6%	0.6%
YKM	Yakima Air Terminal	2,268	2,992	3,948	4,535	0.4%	0.4%	0.3%	0.3%
BLI	Bellingham International	1,215	1,763	2,561	3,088	0.2%	0.2%	0.2%	0.2%
EAT	Pangborn Memorial	654	874	1,167	1,349	0.1%	0.1%	0.1%	0.1%
MWH	Grant County Int'l	530	715	963	1,118	0.1%	0.1%	0.1%	0.1%
CLM	Wm. R. Fairchild Int'l	519	743	1,063	1,272	0.1%	0.1%	0.1%	0.1%
BVS	Skagit Regional	384	560	815	984	0.1%	0.1%	0.1%	0.1%
Total		**600,224**	**835,891**	**1,179,574**	**1,407,181**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: SH&E Analysis

It is expected that this concentration of activity will continue to drive infrastructure requirements for the Seattle and Spokane areas.

Fastest Growth in Air Cargo Demand Expected in Puget Sound, Skagit/Island, Benton-Franklin, and Peninsula RTPO's

Air cargo growth in Puget, Skagit /Island, Whatcom, Benton-Franklin, and Peninsula RTPOs above state average

In taking a regional view of air cargo growth activity, top regional growth is projected to occur in the Puget Sound, Skagit / Island, Whatcom Council of Governments, Benton-Franklin-Walla Walla, and Peninsula RTPO's. Each of these regions is expected to grow at a rate above the state growth forecast as shown in the report.

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